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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

BERNATZ, KEVIN M

ART UNIT PAPER NUMBER

1773

DATE MAILED: 08/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

### Application No.

09/827,900

### Applicant(s)

ZANGARI ET AL.

### Examiner

Kevin M Bernatz

### Art Unit

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) 1-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 27-39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-39 are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

**DETAILED ACTION*****Examiner's Comments***

1. The Examiner notes that the areal recording density of a medium is not a positive limitation in so far as it applies *solely* to the medium. Specifically, while the structure of the medium (including the substrate) affects the recording density (see *Annacone et al.*, U.S. Patent No. 6,194,045, col. 1, lines 28 – 31; and *Tenhover et al.*, U.S. Patent No. 5,741,403, col. 3, lines 5 – 10), there are many additional parameters such as head-disk spacing (*Annacone et al.*, col. 1, lines 38 – 48; and *Tenhover et al.*, col. 1, lines 48 – 56) and the type of magnetic/under layers used (*Guha et al.*, U.S. Patent No. 6,146,755, col. 1, lines 23 – 57, col. 2, lines 42 – 67, col. 3, lines 5 – 22, and col. 5, lines 33 – 45; and *Sandstrom*, U.S. Patent No. 5,972,461, col. 3, lines 51 – 57 and col. 9, lines 35 – 38). The Examiner notes recording densities of over 100 Gbit/in<sup>2</sup>, even up to 400 Gbit/in<sup>2</sup> are known in the art (*Guha et al.*, *ibid*). As such, the areal recording density is only a positive limitation in so far as an apparatus claim is concerned, since it is directed to the combined interaction between the medium and the head used to read and write to the medium. Presently, the claims are directed solely to a medium and for the purposes of evaluating the prior art, the Examiner has interpreted the limitations regarding the areal recording density only as it impacts the structure of the medium.

Specifically, the Examiner notes that the medium *in its entirety* must be capable of achieving the claimed areal recording density, regardless of the relative head-disk spacing.

Art Unit: 1773

2. Regarding the means-plus-function limitation(s) "means for providing a recording density of at least 40 Gb/in<sup>2</sup>" in claim 39, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the corresponding means is a nanoscale particle array comprising nanopores containing magnetic material, wherein the medium is capable of possessing a recording density of at least 40 Gb/in<sup>2</sup>. The equivalent structure is any magnetic recording medium capable of possessing a recording density of at least 40 Gb/in<sup>2</sup>, regardless of whether it's a particle array or not.

3. Regarding the limitation(s) "substrate is aluminum" in claims 31 and 37, the Examiner has given the term(s) the broadest reasonable interpretation(s) consistent with the written description in applicants' specification as it would be interpreted by one of ordinary skill in the art. *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Donaldson Co., Inc.*, 16 F.3d 1190, 1192-95, 29 USPQ2d 1845, 1848-50 (Fed. Cir. 1994). See MPEP 2111. Specifically, the transitional phrase "is" has been interpreted as being open to additional elements (i.e. "comprises aluminum") and not as being closed (i.e. "consisting of aluminum"). Applicants are requested to either amend the claim to better conform to U.S. Patent standards (i.e. "comprises", "consist" or "consisting essentially of"), or to clarify on the record whether

Art Unit: 1773

applicants intend the transitional phrase "is" to be open or closed to additional elements being present.

***Election/Restrictions***

4. Applicant's election with traverse of Group II, claims 27 - 39 in the reply filed on March 16, 2004 is acknowledged. The traversal is on the ground(s) that there is nothing of record to indicate that a product made by the process would be materially different from the product claimed in Group II. This is not found persuasive because the Examiner notes that a product made by the process of claim 1 or 12 could be made with a non-magnetic material or a material wherein the coercivity is less than 500 Oe or an areal recording density is less than 40 Gbit/in<sup>2</sup>. Regarding applicants' argument that there would be no undo burden on the Examiner, this is not found persuasive since the examiner reminds applicant(s) that a separate classification is a *prima facie* showing of a serious burden (see MPEP § 803). In addition, while the search may be overlapping, there is no reason to believe the search would be coextensive. The requirement is still deemed proper and is therefore made FINAL.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 27 – 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Daimon et al. (U.S. Patent No. 5,480,694).

Regarding claim 27, 33 and 39, Daimon et al. disclose a magnetic information medium (*Title*) comprising a substrate (*Figure 3*) having a plurality of nanopores (*Figure 3 and col. 8, lines 35 - 49*) in a surface thereof; and one or more metals deposited in said plurality of nanopores (*Figure 3 and col. 3, lines 45 - 52*) to a depth of at least 5 nm (*col. 9, lines 49 - 51*) and with a coercivity of at least 500 Oe (*col. 4, lines 56 - 67*), wherein the magnetic information storage medium is deemed capable of achieving a recording density of at least 40 Gbit/in<sup>2</sup> depending on the head/disk spacing and/or choice of magnetic material. Specifically, there is nothing in the Daimon et al. reference which would lead one of ordinary skill to ascertain that such a structure could not obtain a recording density of 40 Gbit/in<sup>2</sup>.

Regarding claim 28 – 30 and 34 - 36, Daimon et al. disclose metals meeting applicants' claimed material limitations (*col. 3, lines 45 – 52*).

Regarding claims 31 and 37, Daimon et al. disclose aluminum substrates (*Figure 3 and col. 6, lines 10 – 22*).

Art Unit: 1773

Regarding claims 32 and 38, Daimon et al. disclose pore densities meeting applicants' claimed limitations (*col. 6, lines 47 – 56*).

7. Claims 27 – 31, 33 – 37 and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Kikitsu et al. (U.S. Patent No. 6,602,620 B1).

Regarding claim 27, 33 and 39, Kikitsu et al. disclose a magnetic information medium (*Title*) comprising a substrate (*Figure 13B, element 30*) having a plurality of nanopores (*Figure 13A; col. 8, lines 35 – 49; and Table 1*) in a surface thereof; and one or more metals deposited in said plurality of nanopores (*col.25, lines 26 - 38*) to a depth of at least 5 nm (*col. 25, lines 1 – 20 and Table 1*) and with a coercivity of at least 500 Oe (*Figure 31*), wherein the magnetic information storage medium is deemed capable of achieving a recording density of at least 40 Gbit/in<sup>2</sup> (*Table 1*).

Regarding claim 28 – 30 and 34 - 36, Kikitsu et al. disclose metals meeting applicants' claimed material limitations (*col. 25, lines 26 – 38*).

Regarding claims 31 and 37, Kikitsu et al. disclose substrates comprising aluminum (*col. 10, lines 5 – 23 – e.g. Al-O, Al-N, AlTi-OC, etc*).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 32 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikitsu et al. as applied above, and further in view of Black et al. (U.S. Patent No. 6,162,532).

Kikitsu et al. is relied upon as described above.

While Kikitsu et al. does disclose that the density of the magnetic particles/pores is important for obtaining sufficient signal (*col. 29, lines 31 – 38*), Kikitsu et al. fail to disclose a nanoparticle/nanopore density meeting applicants' claimed limitations.

However, Black et al. teach that in order to obtain high Gbit/in<sup>2</sup> recording density, one must use a particle density meeting applicants' claimed limitations (*col. 7, lines 3 – 7*) (where 1 in<sup>2</sup> = 6.45 cm<sup>2</sup>).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant's invention to modify the device of Kikitsu et al. to use a density of nanoparticles/nanopores meeting applicants' claimed limitations as taught by Black et al. in order to obtain a high Gbit/in<sup>2</sup> recording density.



Art Unit: 1773


**Conclusion**

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Takahashi (U.S. Patent No. 4,650,708) teaches an anodic oxidized aluminum nanopore substrate for magnetic recording medium meeting applicants' claimed material, pore depth and coercivity limitations (*Figures and col. 3, lines 38 – 67; col. 4, lines 33 – 40 and examples*). No rejection was made in view of Takahashi do to its extreme similarity with Daimon et al., applied above. Ohkura et al. (U.S. Patent App. No. 2004/0001964 A1) teach an aluminum substrate comprising nanopores meeting applicants' claimed depth limitations for use as a magnetic recording medium, but fails to teach the coercivity of the magnetic layer (*Paragraphs 0040 – 0044; 0087, 0092, 0105, 0119, 0126, and 0150 – 0159; Figures; and Claim 5*).

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (571) 272-1535. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Kevin M. Bernatz, PhD  
Primary Examiner

August 5, 2004